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(56) Documents Cited

US 4271693 A

(58) Field of Search

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Other: Online: WPI, EPODOC, PAJ, INSPEC

(54) Abstract Title

**Monitoring hazard detectors**

(57) A hazard detector monitoring system comprises one or more smoke, fire or any other hazard detectors 1, each provided with an electronic device 15 containing information unique to the detector so as to identify the detector. The electronic device 15 is preferably a Radio Frequency Identification (RFID) tag. A testing device 2 is located at the end of a pole 3 and held adjacent the detector to read and write to the electronic device 15 through a wireless communication link. The testing device 2 causes the detector to carry out a predetermined operation and the result of the operation, together with the identity of the detector, is read by the testing device. The user 4 is also preferably provided with a data recording device 5 which is capable of controlling the testing device and storing the testing data, via a wired or wireless communication path. The data recording device 5 may alternatively be incorporated into the testing device 2.

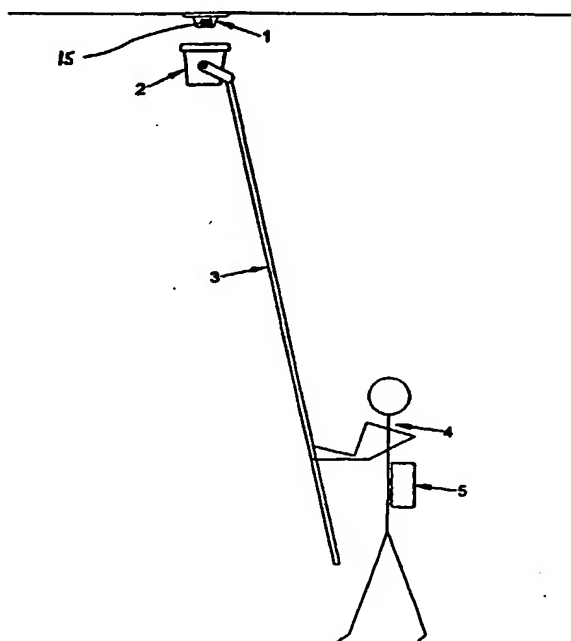


Figure 1

GB 2 385 179 A

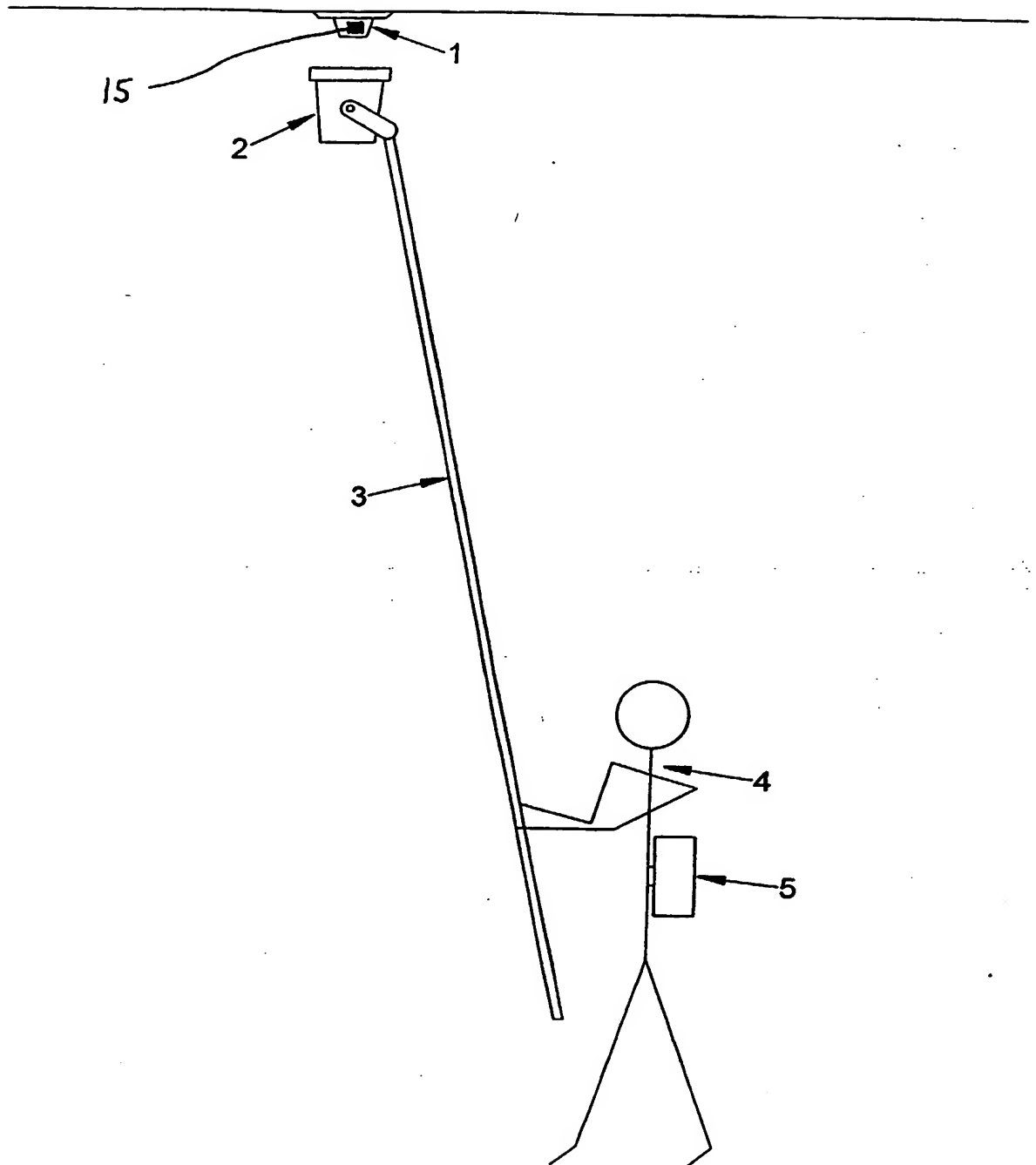


Figure 1

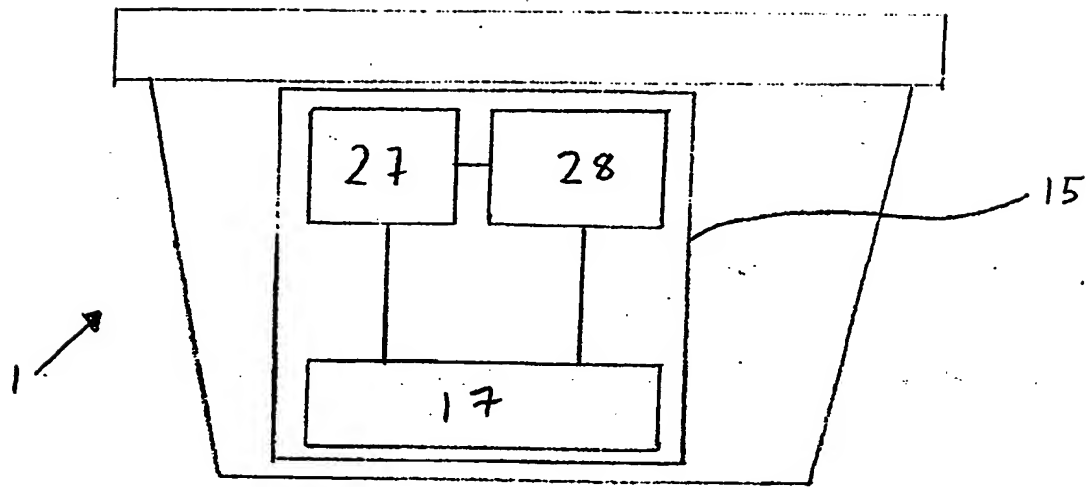


Figure 2

3/3

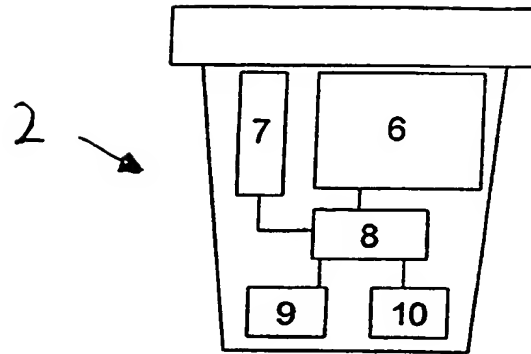


Figure 3

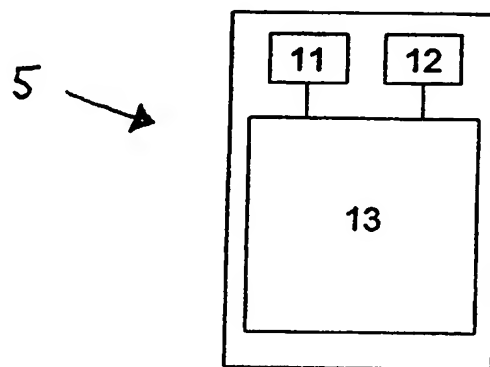


Figure 4

The present invention relates to hazard detection systems. More particularly, but not exclusively, this invention relates to fire detector testers and a method and apparatus for monitoring fire detectors.

5 It will be appreciated that the present invention refers to hazard detectors and this should be taken to encompass fire, smoke, intruder and any detection system which may require monitoring and maintenance in a household or building.

Fire alarm systems in commercial and public buildings use a plurality of fire detectors strategically located around the buildings, usually on ceilings, and connected into a central alarm monitoring unit. The detectors are designed to  
10 respond to one or more indications of a fire such as smoke, heat and carbon monoxide. In order to ensure integrity of the alarm system and maintain fire certification for the premises, the system including all the detectors must be tested on a regular basis and a record maintained of the status of all items.

One method of testing a detector is for the detector to perform an automatic  
15 self test. However, this cannot supply a stimulus to the detector of the type it is intended to detect, ie smoke, heat, etc and can only check the electrical conductivity of the detector. A proper test requires the application of the appropriate stimulus, which is usually achieved by a suitable device attached to a long pole to provide access from ground level.

20 When a plurality of fire detectors is installed, it is necessary to identify each detector in order to maintain a record of when it was tested and the test result, so that it can be verified that all detectors have been tested. The identification is usually carried out manually but can also be done by a barcode, which may exist on the detector. This allows the detector to be identified but the barcode does not  
25 hold any further information.

Another technology exists in the field of identification but has not been associated with hazard detectors. This technology is Radio Frequency

Identification and involves the use of an electronic tag which is capable of holding identification details as well as other useful information. The information is accessed by an interrogation signal being sent from an interrogator (also known as a reader) to the tag and the tag replying to this signal by sending requested information back to the interrogator. The interrogator can also pass information to the tag.

From one aspect, the present invention provides a hazard detector which includes an electronic device that contains data unique to said device and storing means to store other useful data.

The unique data provided by the electronic device may include the detector identity number and the other useful data stored by the device may include the date last tested and result of test.

From a second aspect, the present invention provides a testing device which is located on one end of an adjustable member, so as to reach a hazard detector, said testing device comprising:

reading means to read the data from the electronic device;

a control unit to control an operation to be performed by said testing device.

The testing device may also contain a transmitter and receiver for wireless signal handling between the testing device and another external device with similar wireless signal handling capabilities.

Additionally, the reading means can write data to the electronic device.

From a third aspect, the present invention provides a data recording device which comprises control means to store data received from a testing device and also control the overall monitoring process.

The data recording device may also contain a transmitter and receiver for wireless signal handling from an external device such as the testing device.

It should be appreciated that the data recording device may be incorporated into the testing device therefore removing the need for a separate data recording device.

It should also be appreciated that a communication path between the data recording device and the testing device may be a wired link as oppose to or in addition to a wireless link.

From an overall aspect, the present invention provides a method for monitoring hazard detectors, said method comprising the steps of:

providing the detector with an electronic device containing information unique to the detector;

bringing a testing device within close proximity of an electronic device;

causing the detector to carry out a predetermined operation;

recording the result of the operation of said electronic device;

reading data stored on said electronic device;

In order that the present invention be more readily understood, embodiments thereof will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows the preferred arrangement provided by the present invention to monitor a hazard detector.

Figure 2 shows a more detailed view of the hazard detector in Figure 1.

Figure 3 shows a more detailed view of the testing device in Figure 1.

Figure 4 shows a more detailed view of the data recording device in Figure 1.

The monitoring apparatus of the present invention comprises two or more devices. A first device is an electronic device 15 which is included in a hazard detector 1. A second device is a testing device 2 which is located at the end of an

adjustable member 3 such as a telescopic pole. The apparatus may also comprise a data recording device 5 which may be utilised to store monitoring data.

Figure 1 shows a preferred arrangement of the monitoring apparatus. A hazard detector 1 is typically located on the ceiling of a room. The hazard detector 1 is provided with an electronic device 15 which is preferably a Radio Frequency Identification (RFID) tag which may communicate in a non-contact manner with a testing device 2. To easily access the hazard detector 1, an adjustable member 3 is provided with one end of the member 3 attached to the testing device 2. The adjustable member 3 is held by a user 4 and positioned so that the testing device 2 is in close proximity, typically a few centimetres, to the hazard detector 1. Preferably, the user 4 is provided with a data recording device 5 which is capable of controlling the testing device and storing the testing data. This is achieved through a communication path which is established between the testing device 2 and the data recording device 5. The path may be wired or wireless. It will be appreciated that the data recording device 5 may be incorporated into the testing device 2 removing the need for a separate data recording unit.

Additionally, data contained in such a testing device 2 may be examined in a remote location at a later time. For example, the user 4 may attach the testing device 2 to a computer in an office and download the data from the device 2 to the computer. The data may then be examined and any further instructions may be uploaded to the testing device from said computer and delivered to the electronic device when it is next monitored.

The hazard detector will now be described in more detail by referring to Figure 2.

Figure 2 shows a hazard detector 1 containing an electronic device 15 which is preferably a Radio Frequency Identification (RFID) tag. This is in addition to any parts associated with its hazard detection function. The electronic



device 15 comprises a storage means 27, a control means 28 and a field coupling means 17. The storage means typically includes both RAM (random access memory) and ROM (read-only memory). This allows data that is unique to the detector 1 to be stored in the ROM and hence remain unchangeable and allow  
5 changeable data such as test results to be stored in the RAM. The control means 28 controls the operation carried out by the electronic device 15. The field coupling means 17 couples the electronic device 15 to the testing device 2 by means of a radio frequency electromagnetic field in order to provide power to the electronic device 15 and also to convey data in either direction.

10 The testing device 2 will now be described in more detail by referring to Figure 3. the normal function of testing the detector 1 is carried out by the apparatus 6 which provides an appropriate stimulus to the detector, for example heat or simulated smoke. This does not form part of the present invention. The testing device 2 also comprises reading means 7, a control unit 8, and preferably a  
15 transmitter 9 and receiver 10.

The reading means 7 generates a radio frequency field which both powers the device 15 and reads data from it. This field can also cause data to be written to the device 15 and be stored in it. Data read from the device 15 by the reading means 7 is passed to the control unit 8. The control unit 8 is capable of  
20 communicatng with a data recording device, preferably by using radio transmitter 9 and receiver 10. This communication could alternatively be provided by other means such as a cable, but this would be less convenient. The frequency to communicate between the two devices is predetermined and differs from the frequency utilised between the electronic device 15 and the testing device 2.

25 The data, recording device 5 will now be described in more detail with reference to Figure 4.

The data recording device 5 is typically located some distance away from the testing device 2 as required for obtaining convenient access. The data recording device 5 preferably comprises a receiver 11 and transmitter 12 to communicate with its respective transmitter 9 and receiver 10 on the testing device 2. The device further comprises control means 13 which can store data received from the testing device 2 through the wireless communication path, and also to control the overall testing process.

It will be appreciated that the receiver 11 and transmitter 12 may not be required if a wired connection is utilised between the testing device 2 and the recording device 5.

It will also be appreciated that the control means 13 may be included in the testing device 2 hence removing the need for a separate data recording unit.

## CLAIMS:

1. A method for monitoring a hazard detector, said method comprising the steps of:
  - 5 providing the detector with an electronic device containing information unique to the detector;
  - bringing a testing device within close proximity of the electronic device;
  - causing the detector to carry out a predetermined operation;
  - recording the result of the operation of said electronic device; and
  - 10 reading data stored on said electronic device.
2. The method according to claim 1, wherein the result of monitoring said electronic device is stored in said electronic device.
- 15 3. The method according to claim 1, wherein the result of monitoring said electronic device is stored in said testing device.
4. A hazard detector, which includes a power source and an electronic device that contains data unique to said device and storing means to store other useful data.
- 20 5. The hazard detector according to claim 4, wherein said electronic device is arranged to be powered by a signal from external source, and said signal being received by power reception apparatus.
- 25 6. The hazard detector according to claim 4, wherein the power source is a battery.

7. The hazard detector according to claim 4, wherein the power source is mains electricity.
- 5 8. The hazard detector according to claims 5, 6 or 7, wherein said hazard detector is a smoke detector.
9. A testing device for a hazard detector, which is located on one end of an adjustable member, said testing device comprising:
- 10 reading means to read data from said electronic device;  
a control unit to control operations performed by said testing device.
10. The testing device according to claim 5, further comprising:  
a transmitter and receiver.
- 15 11. A testing device substantially as hereinbefore described with reference to the accompanying drawings.

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Application No: GB 0202791.0  
Claims searched: 1-3 & 9-11.

Examiner: Melanie Gee  
Date of search: 14 October 2002

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.T): G4H (HNK)

Int CI (Ed.7): G08B

Other: Online: WPI, EPODOC, PAJ, INSPEC

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
A	US 4271693 (BUTE)	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.